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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,393	10/30/2003	Thomas Holtzman Williams		7468

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THOMAS H. WILLIAMS
6423 FAIRWAYS DR
LONGMONT, CO 80503

EXAMINER

CORRIELUS, JEAN B

ART UNIT	PAPER NUMBER
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2611

MAIL DATE	DELIVERY MODE
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09/05/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/697,393

Applicant(s)

WILLIAMS, THOMAS HOLTZMAN

Examiner

Jean B. Corrielus

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2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings were received on 7/26/07. These drawings are acceptable.

Claim Objections

2. Claims 5 and 8 are objected to because of the following informalities: claim 5, line 2, "a recovery" should be replaced by "said recovery" so as to make use of antecedent in claim 3. Claim 6, line 10, "s" should be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art fig. 1 in view of Kuchi et al US Patent No. 7,006,579. As per claim 1, Applicant's admitted prior art fig. 1 teaches a system comprising a transmitter (102-112) transmitting a transmit symbol sequence that has been created by multiplying the input sequence by a transmission matrix 108 a signal path see fig. 1 a

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receiver 114 receiving a received symbol sequence and a processing element multiplying the received symbol sequence by a recovery matrix, whereby an output symbol sequence is produced see 118 and 120. However, the admitted prior art does not teach that the system can also be used with matrix comprises non-orthogonal basis functions. However, as evidence by Kuchi, see abstract, it is well known in the art for a system to use matrix that comprises non-orthogonal basis functions. Given that fact, it would have been obvious to one skill in the art to incorporate non-orthogonal basis function in the matrix in the admitted prior art in order to increase the symbol rate and transmit diversity in a wireless mobile communication as taught by Kuchi et al see abstract, lines 1-9. Note that in addition the number of code allocated for transmission would have been increased thus removing the code limitation encountered in spread spectrum system. The admitted prior art further teaches that the recovery matrix is a transpose matrix see page 6, last two lines as oppose to an inverse of the transmitted matrix. However, it is well known in the art to compute a recovery matrix as the inverse of the transmitted matrix. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in applicant's admitted prior art in order to generate the matrix required to recover the transmitted signal.

As per claim 2, the admitted prior art further teaches that the matrix is a square matrix see page 5, 3 lines before last.

As per claim 3, see claim 1. In addition, note that the claimed "overdetermined matrix" is nothing but a matrix where the number of rows are different than the number of column, per the specification page 9, line 9. Hence, It would have been obvious to

one skill in the art to form the matrix so that the number of columns is different than the number of rows so as to satisfy system requirements. Applicant's admitted prior art further teaches that the recovery matrix is a transpose matrix see page 6, last two lines as oppose to a pseudo-inverse of the transmitted matrix. However, it is well known in the art to compute a recovery matrix as the pseudo-inverse of the transmitted matrix. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in applicant's admitted prior art in order to generate the matrix required to recover the transmitted signal.

As per claim 5, it is well known in the art to remove redundant symbols, added prior to transmission, during processing of the received signal in order reduce processing load of the system. And the further it would have been obvious to one skill in the art to create a recovery matrix from the pseudo-inverse of the transmission modified by corrupted terms in the received symbol sequence and the motivation to do so would have been the same as provided above with respect to claim 3.

As per claim 6 see claim 3 above. In addition, the admitted prior further teaches that an IFFT is performed in the transmitting side see page 7, line 4. A FFT at the receiving side is inherent so as to convert the signal back to frequency domain.

As per claim 7, it is well known in the art to include guard band in a transmitted signal in order to prevent interference from one to another frame.

As per claim 8, it is well known in the art to remove corrupts symbols from a received signal during signal processing so as to enhance signal reconstruction.

Response to Arguments


5. Applicant's arguments filed 7/26/07 have been fully considered but they are not persuasive. It is alleged that applicant admitted prior art fig. 1 and Kuchi do not render the claimed invention obvious because Kuchi teaches a non-orthogonal basis function that uses mathematical functions. Such point of argument is not convincing because the claim is limited only to a "**non-orthogonal function**". Kuchi clearly show such a feature of the claimed invention see, for example the abstract. Examiner maintains that the invention, as claimed is obvious in view of admitted prior art and the teaching of Kuchi for the reasons for the reasons provided in the last office action. In addition applicant's comment with respect to the obviousness rejection of claim 3 is not understood since the claim include no limitation directed to "inverse matrix".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Monday-Thursday from 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Jean B Corrielus
Primary Examiner
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8.30.07